En-vac Robotic Wall Scabbler

INEEL
Idaho National Engineering & Environmental Laboratory
BECHTEL BWXT IDAHO, LLC

Technical Demonstration Summary Sheet
ROBOTIC WALL SCABBLER

THE NEED

The Idaho National Engineering and Environmental Laboratory (INEEL) has a need for a device to remotely remove hazardous or radioactive paint from vertical surfaces such as walls and pools. A technology is needed that removes workers from exposure to radioactivity and hazardous materials during decontamination activities. The current method is to use hand-held scabbling devices, which result in direct worker exposure to radioactive and hazardous material.

THE TECHNOLOGY

The En-vac robotic wall scabbler uses abrasive steel grit blasting to decontaminate metal and concrete surfaces. The mobile robotic unit moves along the work surface and adheres to it with the help of a high vacuum suction created at its base. It can climb walls and move over inverted surfaces. It functions equally well on floors or slopes. Mobility is provided with individually motor controlled wheels. The complete system consists of the En-vac robot, recycling unit, filter unit and a vacuum system. The vacuum system adheres the unit to the wall, the filter removes the scabbled debris, and the recycler passes the grit through the system again. This unit is capable of scabbling concrete to a depth of 1/8 inch per pass. On curved surfaces the standard robot unit requires a minimum radius of 9 foot.

THE DEMONSTRATION

DOE's National Energy Technology Laboratory (NETL) D&D Focus Area funded the demonstration of the En-vac Robotic Wall Scabbler at the Idaho National Engineering and Environmental Laboratory (INEEL) as part of the INEEL Large-Scale Demonstration and Deployment Project (LSDDP). The technology was demonstrated in March, 2000, at the INEEL Test Area North (TAN) to remove PCB, lead, and radioactively contaminated paint and/or concrete from the TAN-607 Decontamination (Decon) Shop walls by an abrasive blasting technology. The En-vac Robot's scabbling performance was compared against the baseline, which was a hand-held scabbling/grinding unit.
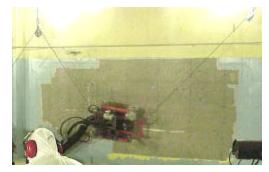
THE RESULTS

The En-vac Robotic Wall Scabbler was assembled in a matter of minutes and proved very effective in removing multiple layers of paint from concrete walls. The En-vac Robot scabbled to a depth of 1/8 of an inch, while the baseline scabbler only removed the surface multi-layers of paint on the concrete walls. During the demonstration, no airborne contamination was detected with the En-vac Robot or the baseline technology. The En-vac removes workers from the immediate vicinity reducing exposure to hazardous material and radioactively contaminated areas. The En-vac Robot performed extremely well in unobstructed areas; however where piping and conduit constricted movement, speed and efficiency were reduced. The unit must be manually repositioned around pipes and obstructions. On average, on flat unobstructed surfaces, the En-vac Robotic Wall Scabbler was five times faster than the baseline technology which removed only surface layers of paint. The wall scabbler can only get within eight inches of a corner or obstructions leaving areas closer than that to be decontaminated by hand-held scabbling/blasting equipment.

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BENEFITS

- Reduces worker exposure
- Accelerates schedule
- Collects and contains scabbled waste
- Reduces contamination spread
- Up to 5 times faster than the baseline

ROBOTIC WALL SCABBLER
http://id.inel.gov/lsddp

Robotic Wall Scabbler on the TAN Decon Shop wall

NETL

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